

Science could be different if the old dogmas, and the old ideas that physicists have had about the world, were replaced by more progressive ideas about the nature of the world. This essay discusses three questions that illustrate the limitations of the old dogmas and the old ideas: “Why is the universe moving?”, “What exists?”, and “Can everything that exists be measured?”.

Why is the universe moving?

Many people seem to have the mistaken impression that physicists can explain why the world, the universe, is moving and changing. If true, this would mean that physicists would be able to explain why the numbers, that apply to categories like relative position, time, or energy, in the equations that represent physics’ laws of nature, are moving or changing. In short, physicists would be able to explain why the *numbers* are changing.

The physics’ view seems to be that number discontinuities or random number jumps occur, but without any cause or causer; and/or that the mathematical laws of nature, or even the categories contained within these laws like the time category or the energy category, are not just mathematical categories, but are somehow causal entities because they have what might be called “additional powers” to cause number movement.

But in fact, all that physicists can reasonably and modestly say is that IF some numbers jump to new values (for example, the apparently random number jumps in a quantum event), THEN some other numbers that apply to other categories will be found to have also jumped to new values in accordance with the law of nature relationships. In other words, while physicists know the experimentally derived lawful relationships, they can’t explain how or why the world is moving and changing.

Physicists have a philosophical view, which is more correctly described as a dogma, which says that *nothing* causes the unpredictable number jumps. But these philosophical views about how the world works have implications for how human beings see themselves and the world they live in, including philosophical ideas of “free will”. In fact, there is nothing that would invalidate the idea that matter is the causal entity that has the “additional powers” to jump its own numbers to its own preferred values. In this view, the basic-level free will, or creativity, of matter could be seen as the free, apparently random from the point of view of external observers, assignment of numbers to some of the above-mentioned categories, whereby other numbers for other categories would change by virtue of the mathematical relationships between the categories.

A world where matter has the free will to jump some of it’s own numbers is a very different type of world to the world that the physics’ dogmas say we live in. These dogmas imply that, when all underlying events are looked at closely, Vladimir Putin’s actions and movements are unable to be distinguished from the movements of a bouncing tennis ball. And the dogmas imply that Putin can be no more responsible for his actions or

movements than a tennis ball is responsible, because neither he nor the tennis ball are the type of entity that would have the ability to jump some of their own numbers to their own preferred values. Instead, the dogma says that every single one of Putin's and the tennis ball's numeric values was determined by the impersonal laws of nature.

Except for QBism, none of the physics' dogmas (for example, the block universe dogma, or the multiverse dogma) can tolerate or abide the idea that we might live in a genuinely creative world where entities, like living things and maybe even the components of matter itself, have the free will to jump some of their own numbers, thereby naturally affording such entities the genuine responsibility for their own physical actions and outcomes.

Physics' dogmatic philosophies and beliefs have misled many into believing that every single number movement in the universe is necessarily caused and determined by wholly impersonal entities like the laws of nature or something that could be described as "random chance". But in fact, physicists can't reasonably make that claim.

And in view of the current interest in the difference between life and non-life, it would seem that a prerequisite for life would be physical entities that have the "additional powers" and flexibility to jump at least some of their own numbers in a logical-analytical IF...THEN... response to their immediate surrounding circumstances. But tennis ball-like entities don't seem to have the necessary prerequisites for life because they can only ever have an inflexible response to their immediate surrounding circumstances, a response that is wholly determined by the mathematical laws of nature.

What exists?

Physics was supposed to be the science that wasn't dazzled by superficial appearances, the science that looked deep into the foundations of reality to find out how the world worked. But now, some physicists are being dazzled by the superficial appearances of "artificial intelligences" (AIs), and openly claiming that computers/ AIs could be conscious. The conscious machines dogma is another one of the old dogmas, one that generations of science fiction books have primed people to believe in. But can machine consciousness exist? Now seems to be an appropriate time for physicists to clarify for themselves: "What actually exists?", and "What *can* exist?".

It is generally agreed that consciousness is an aspect of the world that definitely exists. Subjective consciousness seems to be precisely the aspect of the world whose existence is necessary in order to detect what *e*/se exists in the world; and consciousness also seems to be precisely the aspect of the world that, via a type of logical analysis, is capable of creating a bigger subjective picture of what exists in the surrounding world. This bigger picture is continually being fashioned out of low-level data that is input via the eyes, ears and other senses possessed by living things.

But unlike conscious experience, awareness and knowledge, the physical world, including any physical correlates of consciousness, is potentially measurable. But what does “measurable” mean? Measurement (and indeed, mathematics) is only possible because from the ground up, the physical world is inherently categorised into aspects like relative position and mass, categories that only exist in terms of relationship to other such categories; and the result of a measurement is a number that is only relevant with respect to a category (and a measurement unit). Potentially measurable categories with their associated numbers, together with relationships, is what characterises the universe of things that physically exist.

Given the correlation that seems to exist between the physical world and consciousness, it would not be surprising if the inherent categories and relationships characteristic of the physical world were also a characteristic of knowledge and experience. And this *does* seem to be the case, at least with higher-level knowledge and experience. Knowledge and experience *does* seem to be inherently categorised, where the categories seem to exist in an environment of other categories that are related in some way, and where each category seems to have some sort of quality or intensity or some other characteristic that a scientist might represent with a number. Just like the case of the things that physically exist, categories, relationships, and something that might be represented by numbers seem to be fundamental characteristics in the case of conscious knowledge and experience.

But on the other hand, there can be no such things as numbers that exist without being assigned to a category, because numbers are not themselves categories, which means that they have no inherent relationship connection to anything else. While having no inherent relationship connection to anything else might be a useful property, you can’t build a world out of numbers alone. These isolated numbers are concepts that exist in subjective consciousness, and they would seemingly have physical correlates that exist in a person’s brain, but just like fairy tales, they only exist in the human imagination, they can’t exist anywhere else. Numbers that are isolated entities, because they don’t have an associated category, can’t exist, no matter what number system is used to represent the number (for example a decimal, hexadecimal, or binary number system).

And this is where binary digits and qubits come in: they are supposed to be number-like things; things that have no inherent categories, and thereby no inherent relationship connections to anything else. The binary digit concept is implemented in computers using special system setups involving circuits, transistors, and voltages, whereby the whole setup is used to symbolically represent the binary digits, categories, numbers, letters, and mathematical and logical relationships and operations, et cetera. But the difference between genuine categories with their lawful relationships, and binary digits that can merely symbolise categories and relationships, is the difference between

an atomic bomb explosion and a symbolic representation of an atomic bomb explosion on a computer screen.

In a computer, depending on the circuit design, a higher range of voltage numbers within the voltage range can represent the binary digit one, OR a lower range of voltage numbers within the voltage range can represent the binary digit one. In other words, there is no law of nature relationship connecting the binary digit one or the binary digit zero with the actual voltage numbers that exist in the circuits. Unlike the binary digits, voltage is a measurable category that is inherently related to other such categories, and other aspects of the world. Binary digits and qubits are things that don't actually exist, except in the human imagination, because the binary digits and qubits themselves are not categories, have no measurable categories, and thereby have no inherent relationships to anything else. The only measurable categories and numbers that exist within a computer, that could potentially correlate with any consciousness allegedly experienced by the computer, is the voltage category with its associated limited range of numbers.

Science could progress if physicists ditched the old conscious machines dogma, and instead examined the essential differences between what can actually exist, and what can only exist in individual subjective human minds and imaginations.

Can everything that exists be measured?

Nobel Prize winning physicist Sir Ernest Rutherford once said: "That which is not measurable is not science. That which is not physics is stamp collecting". However, if the world *does* in fact contain non-measurable elements, then that dogmatic view of science would mean that physics could never hope to explain how the world works.

Physics has always represented the universe that we live in in terms of categories, mathematical relationships between these categories, and numbers that apply to these categories. So, relative position, mass, spin, and charge all seem to be natural categories that seem to exist in relationship to other such categories in the world.

But while physicists have inferred that lawful relationships, representable by equations, seem to exist between the natural categories, only the *category* part of these relationships is potentially measurable. Neither the aspect of the world that is represented by the mathematical operators in the equations, nor the aspect of the world that is represented by the equals signs, is a measurable aspect of the world. In other words, these are examples of the type of aspects of the world that are not measurable. The non-measurable parts of the world are the aspects of the world linking the categories; it is the operators, the links that are not measurable.

And it is seemingly a somewhat similar situation with quantum mechanics, where any links between the potentially measurable categories, with their associated numbers derived from measurement, are not measurable aspects of the world.

When it comes to these links, one could make an analogy between quantum mechanics and a computer program. When people write an IF...THEN... statement for a computer program, the statement will contain logical connectives and mathematical operators, but the “THEN” part of the statement can be anything a creative computer programmer wants it to be. This is because, in this case, when writing a computer program, the logical connective “THEN” does not actually represent a logically or mathematically necessary consequence of the “IF” part of the statement. (However, once written, the statements in the computer program become mathematically necessary instructions for the computer to follow, due to laws of nature.) So, just like the way statements are written in a computer program by a computer programmer, each unique and unpredictable quantum number jump could potentially be thought of in a similar way, where matter is an entity that has a hand in writing its own outcomes, such that not all the outcome conditions are logically or mathematically necessary consequences of the input conditions.

In any case, any links that might possibly exist between the potentially measurable input conditions, and the potentially measurable output conditions of a quantum event, are not themselves measurable: any linking aspects of the world that might be representable as logical connectives (like IFs, ANDs, ORs, THENs, IS TRUEs, and equals signs), or representable as mathematical operators, are not measurable aspects of the world. These essential, but non-measurable aspects of the world, that are only representable as logical connectives and mathematical operators, are seemingly the only aspects of the world that could correspond to the non-measurable consciousness aspect of the world. In this view, consciousness is not so much *of* things; instead, consciousness is the aspect of the world involved with the mathematical and logical connections, links, and relationships *between* things.

It is seemingly only old beliefs that are preventing the recognition that non-measurable aspects of the world do in fact exist. Science could progress if physicists ditched their old dogmatic beliefs.